Griscom (J. H.)

PRISON HYGIENE:

AN ESSAY

PREPARED

AT THE REQUEST

OF THE

PRISON ASSOCIATION OF NEW YORK,

FOR INSERTION IN THEIR

TWENTY-THIRD ANNUAL REPORT,

AND REPRINTED BY THEIR ORDER.

BY

JNO. H. GRISCOM, M. D.,

ONE OF THE VICE-PRESIDENTS OF THE ASSOCIATION.

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PRISON HYGIENE.

By JOHN H. GRISCOM, M D.

This branch of the management of penal institutions affects not only the physical health, but also the morals and discipline of the convicts, and likewise in no small degree the interests and reputation of the governments having control of the institutions.

The *subjects* of prison discipline constitute a class of beings *sui generis*. They are peculiar in both their physical and moral relations. The prisoner, deprived of the means of suiting himself in his appetites and propensities, is compelled to act in accordance with the views of others as to what is proper for him. With the wants and habits pertaining to an education among families and friends, he must yield all to the requirements of his keeper—a stranger. With the strength of a man, he is become, in many respects, as a child. From being his own master, to clothe, feed, and house himself how and when he pleased, he is now passive in the hands of others, to be treated herein as they may dictate. Deprived of all the aspirations and prospective pleasures which sweeten life and give a zest and stimulus to his feelings and functions, both mind and body are immured in the narrowest possible precincts, and pursue their unrequited labor in an unending and never-varying routine. While, on the one hand, he is restrained in the indulgence of propensities and passions to which he was before prone, and which are calculated to vitiate his constitution, and sow the seeds of disease, on the other hand, he is cut off from many of those sources of health which are found in freedom of body and variation and application of mental power. In studying the diseases to which mankind are subject, and the means of preserving or restoring their health, prisoners are therefore to be viewed in an aspect materially different from other men, and *prison medicine* becomes a separate and distinct branch of the science.

The first, and one of the most important of the considerations relating to the hygienic management of a prison, is its *location*.

Every consideration of healthfulness that should govern the selection of a site for a private dwelling, applies with equal, or even greater force, to the site for a prison. Beauty of location, magnificence of prospect, attractiveness of scenery, of course can have no *ruling* value in this connection; to the prisoner it is the same whether his abiding place is deep in the valley, or on the bright hill side; for him the garden yields no odors, the winds make no music on the waving trees, the brook babbles not for his ear, the moon sheds no soft lustre for his eye. Though these circumstances might not be incompatible with his safety, and, if possible, to be studied in connection with his incarceration, they would doubtless aid in subduing the passions, elevating the moral sentiments, maintaining discipline, and promoting corporeal and mental health, yet, as a general rule, the prisoner must see and hear nothing beyond his grated door. His senses are closed against everything that makes life attractive. But the State has no right to close against him the physiological avenues of health; on the contrary, it is bound, by every consideration of justice, humanity, and interest, to preserve his health and strength, if he brings them with him, and to redeem them, if possible, if they have been squandered. It is bound to bring into requisition all that art and science can furnish to obtain this end.

The situation of a prison should therefore be as salubrious as possible. It should not be in proximity to any marsh; it should be far enough from any large streams, and of sufficient altitude to avoid the mists and fogs which prevail most abundantly upon and near the water; yet not so high as to be exposed too much to bleak winds, nor beyond the ready reach of the necessaries of life.

The soil immediately under and for a large area around the prison should be naturally dry, and, if not, should be thoroughly drained. The quality of the air is greatly affected by a constant humidity prevailing over damp grounds, influencing, to a considerable extent, the health of the prisoners.

In illustration of these principles, Dr. Baly, physician of the Milbank prison, regards diarrhœa as sometimes produced by a moist state of ground for some extent around the prison. He stated that "the Wakefield house of correction, in which diarrhœa was more generally prevalent than in any other prison in England, was situated in a hollow valley of clay which was often flooded in winter, and in summer was not quite dry. The sub-soil was clayey and the surface of a rich vegetable character." Our

State prison at Sing Sing presents an exemplification of the influence of both these circumstances. The male department is placed on the west side, and at the foot, of a high hill, and so near the river, on its very edge, that the sun in the morning cannot dispel the fogs which almost nightly collect there, for a long time after it rises. The consequence is, not only that the iron locks, if unused for a short time, become injured by rust, and the clothing and other things covered with mould, and mildewed, but rheumatisms, inflammations, pulmonary, cutaneous and other complaints cannot but be more prevalent than in prisons free from such a degree of dampness. At the female prison, placed nearer the brow of the hill and at a greater distance from the river, these evils are not observed to anything like the extent they are found below.

Per contra, the Clinton State prison is located near the top of a bleak and barren mountain, 1,330 feet above Lake Champlain, accessible with much difficulty over a hard road, and requiring more expense for transportation the seventeen miles from Plattsburg than for the one hundred and eighty miles from Albany to Plattsburg; and is entirely beyond external aid, should an outbreak ever occur. One effect of this altitude is to shorten the summer and prolong the winter—the ground being covered with snow, generally, until May or June. Its situation in other respects is, however, decidedly beneficial.

One of the *most* important of the considerations relative to the location of a prison is the facility for thorough drainage and sewerage.

The points next to be considered—the external location of the prison having been determined—are its *internal atmosphere* and its *dietary*. The latter of these will be remarked upon first. It has, however, been so often and so ably discussed, that it may appear a work of supererogation to occupy much space with it. General dietetic rules are well laid down at present, and those which apply to persons out of prison, excepting so far as the condition of the prisoner varies from theirs, are applicable to the convict. But these points of difference between the *ins* and the *outs*, in connection with the subject of *dietetics*, are of great importance; for it is well known that the ability of the human system to assimilate to itself the substances introduced within it, to sustain its integrity and strength, and to promote its growth, depends in no small degree upon circumstances external to the body. It is from non-attention to the necessary accommodation of the

dietaries to these changes of circumstances, that the dietetic evils of prison life chiefly arise. The demand of the body for food is in part regulated by its labor. The laborious artisan or the industrious farmer has not only a greater power of digestion, but actually has a greater requisition for nutriment, than the scrivener or the student; and a change from either of the former to either of the latter occupations requires a corresponding change in the amount of *ingesta*, or the system will be overburdened.

The injunction issued by the apostle Paul, that "if any would not work, neither should he eat," is founded not less in physiology than in morals; and without sacrilege we may add, *he who eats and does not work, shall surely suffer*. This law was strikingly illustrated, and also vindicated, in a case which some time since came under my own professional observation. An industrious blacksmith labored assiduously from morn till eve at his anvil, ate a corresponding amount of food and slept the sleep of health and happiness. At about the age of 35, he drew a lottery prize which placed him above the pecuniary necessity of manual labor, and unfortunately induced him to abandon his forge for the desk of an exchange office, where, instead of the sledge, he handled nothing heavier than small coins. But without sufficient prudence to alter in a corresponding degree his dietetic habits, he gauged his supply of nutriment rather by the pleasures of the palate, than by the demands of labor. The consequence was that in a few weeks, the overloaded system made an explosion, in the form of apoplexy, followed by hopeless and fatal paralysis.

Among the most important circumstances necessary to be considered in regulating the quality as well as the quantity of food, is the constitutional diathesis of the individual. In some there will be found a tendency to plethora, in others to anemia,—one class will be predisposed to scrofula, another to dyspepsia, a third to consumption, &c.

If in social life, among the members of a family or a community, whose habits, occupations, and educations are very similar, we discover such a variety of requisitions for food of different qualities and amounts, is it reasonable in a community of 500 or 1000, drawn from as many different families, from a dozen different nations, from every station in life, with every variety and shade of education and complexion, from the ages of 16 to 60, of both sexes, to expect such a similarity or elasticity of organization as will accommodate all to the Procrustean dietary of a prison? In the *condi-*

tion of the mind, we find another potential influence over the capacity of the organization to receive and assimilate nourishment. The human mind may be likened to a pendulum. Both have their elevations and depressions, and their oscillations give to the structural works with which they are connected, a stimulus important to their regularity and perfectness. Without motion of the mental pendulum, the material organization of the body may indeed have life, but it can only be such as pertains to the vegetable; the animal may eat and live, but it will live only to eat, and in a brief space will die. But the highest degree of animalization, the most perfect enjoyment of vitality, and the greatest energy of body, are found in those whose arc of mental oscillation is traversed with regularity. The point of lowest depression being no sooner reached than it is quitted, the pendulum rises again, while for each period of depression there are two of elevation, and thus the movements of the animal body, as of the clock, are maintained with uniformity and order. As it is necessary for the going of the clock that its pendulum should regularly be depressed, so must the mind be also, at times, that by its reaction it may give a healthful impetus to the bodily functions. The strict comparison here terminates, as in the clock, if the pendulum remains at its center, its functions cease; though the vibrations of the mental pendulum may be arrested, and it remains at its lowest point of depression, the functions of the system will not cease entirely, yet it cannot be otherwise than that their energies will be depressed, and they become, as it were, rusty and sluggish. And how must it be with the mind of the convict? Unstimulated by the hopes and fears pertaining to freedom, unmoved by the enjoyments and trials of social life, it oscillates no longer between the pleasurable extremes of its arc through its middle point of suffering and sorrow. In his abnormal condition, it hangs like the motionless pendulum, in idle dependence. Can it be expected otherwise than that the bodily organs must be less able to perform their functions with their usual vigor?

The medical reports of some of our prisons, unequivocally demonstrate their dietaries to be far from what they should be. *Scurvy*, a direct product of improper diet, prevails in these institutions to an extent unknown anywhere else except in long sea voyages, under protracted privation of fresh food. Between 30 and 40 cases are ascertained to have occurred in Sing Sing prison in one year, and we have much reason to believe the whole is not always

told. This will occasion no surprise when it is known that the prison diet in general includes very little of any of the fresh and juicy vegetables, which are so essential to the prevention of this disease.

In one of the early reports of the New York Prison Association, the following remark is made in reference to the number of cases of this disease occurring in Sing Sing: "It is a disgrace to the State that, in the midst of a country producing such a profusion of vegetables, they should suffer the convicts to be deprived of the necessary and health-giving aliments, until such results are produced."

It was a wise recommendation, therefore, of the physician of Auburn prison, in his report for 1845, that a portion of the public lands adjoining the institution should be set apart for cultivation by the convicts, that they might be furnished with a better vegetable diet. It should be done everywhere, both for the sake of the diet and the out-door labor.

In the reports of the Ohio State prison most remarkable results of mismanagement are given. For example, during the five years from 1842 to 1846 inclusive, there were reported a yearly average of 752 cases of disease occurring in an average of only 498 prisoners, making the number of patients 50 per cent greater than the number of inmates. It is presumable that every prisoner, therefore, must have been sick once, and half of them twice, each year. The number of lost days of labor during that period was 27,332.

A few remarks will now be made upon the subject of

Ventilation.

The necessity of a pure atmosphere to a healthy condition of the blood under all circumstances being admitted, as it cannot be denied, it is particularly important, in determining the salubrity of any position in which a human being may be placed, to ascertain in what degree of purity he may breathe the air.

We know that animal respiration destroys that quality of the atmosphere by which life is sustained; it removes the oxygen and substitutes for it not only an impurity, but a positively deleterious substance — carbonic acid gas — besides also a large amount of watery vapor.

Every intelligent person can appreciate the value of purity in the food which he eats or the fluids he drinks, but as far as my ob-

servations have extended, the number is very small who fully understand either the great value of, or the means of obtaining, a corresponding purity in the air respired.

Let us in a brief manner glance at the *relative importance* to the animal system of these two great sources of its support and health—air and food. The comparison is made on the following grounds:

1. Fresh supplies of food are required only three times daily, but air must be furnished twenty times every minute.

2. Many impurities of food are detected, separated and rejected by the process of digestion. Indeed, for wise reasons, much of our ordinary diet is composed of innutritious matter. But the lungs have no power of separating the bad from the good of the atmosphere. On the other hand, what may be in the lungs a deadly poison, may in the stomach be refreshing and exhilarating, *e. g.* carbonic acid gas.

3. The quantity of food proper for a meal is limited by the *physiological* power of the stomach, which is far short of its areal capacity. The quantity of air that may be safely inhaled is limited only by the *physical* capacity of the lungs to receive it.

4. The function of respiration is the last act of digestion. The best food would be as useless as clay or sand without the aid of the oxygen of the atmosphere to convert it into blood. The more oxygen inhaled, the more perfect is the sanguification of the food.

5. Food may be eaten too rich and nutritious in quality; the stomach will pall at *ingesta* of such character; but atmospheric air can never be inhaled too pure or too abundantly.

Guided by these axioms we may deduce the rules of practice in relation to ventilation necessary for the maintenance of sound health.

At all times, under every circumstance, in whatever position, the air respired should be in perfect purity. The slightest deviation, by so much, impairs its sustaining and invigorating power.

It is estimated that under all the circumstances of household life *ten cubic feet per minute* are required to supply the lungs of each individual with perfectly pure air at every inspiration, *i. e.* to avoid all possibility of reinhaling the same air. In prisons generally there is no cooking, and but little combustion for warming and lighting; therefore but little exhaustion of oxygen other than by respiration alone. Making the proper allowances for these peculiar circumstances, it is safe to estimate the quantity

of air necessary for the continued pure respiration of a prisoner, of four cubic feet per minute. Each cell, if of the size of those at Sing Sing, when the prisoner is in it, contains about 160 cubic feet of air. Supposing the cell to be entirely close, and the respired air to be immediately on expiration removed from the vicinity of his mouth and nostrils, and to be replaced by a portion of the unrespired air of the cell, this will supply him with the latter for a period of forty minutes. He then begins to reinhale the air, and in forty minutes more it will all have twice passed through his lungs, in two hours a third time, and when shut up eight hours he inhales the same air twelve times.

But at Sing Sing the cell doors are grated, which renders the air of the halls accessible to the cells, and gives an amount of air to the inmates equivalent to perhaps three times that of the cell alone. Here, however, we have in the winter, the fires for warming, which consume a considerable quantity of the oxygen, and which also rarify the air more or less. At the most favorable estimate, supposing no air to be admitted into the building from without, which is the fact, except by the occasional opening of a door, the prisoners reinhale the air every two hours. Shut up for twelve hours, they breathe it over six times, and on Sundays being confined therein from noon, until six the next morning, the same air passes through the lungs nine times. Nor is this all; there being no specific or sufficient method of changing the atmosphere of the prison, even while the prisoners are in their workshops through the day, they must at night enter nearly the same atmosphere they quitted in the morning, and this must be repeated for weeks and months.

The natural *law of diffusion of gases*, by which an equilibrium of oxygen is attainable in the atmosphere, whenever a communication is possible between any two bodies of air, tends in a considerable degree to overcome the evils of respiration in many similar places, but this cannot operate through stone walls, or even through transparent windows. The crevices of the windows and doors afford a little opportunity for its operation, but so utterly inadequate to the necessities of the case are these openings, or even the miscalled ventilating apertures of the roof, that they need not, and in practice should not be taken into consideration. There is, therefore, almost no ingress of external air, certainly none in a systematic or appreciable degree.

There are few who have not sometimes noticed the condition of

the air of an ordinary chamber in a common dwelling, say a room eighteen feet square, and twelve feet high, occupied by only two persons. The most scrupulously clean, if unventilated, will give an odor in the morning, after a night's occupation, which those who enter it from the fresh air, will find, to say the least, exceedingly disagreeable, though not cognizable at the time, by the senses of those whose pulmonary and other animal secretions have produced it. Yet in such a room there will be nearly 2,000 cubic feet of air for each person. Now let any one imagine himself to have slept (if sleep he could) all night in a cell with less than one-tenth, or at the largest calculation, one-fourth of this amount of air. It will be difficult to imagine the feelings with which the morning will dawn upon him; unrefreshed, feverish, exhausted with perspiration, and his blood overloaded with carbon, it is impossible to suppose himself strengthened for the laborious duties of the day. There are nine cells in Sing Sing especially devoted to punishment, having doors as nearly impervious to light and air as doors upon hinges can well be made. From the depths of these dark cells we have heard the voices of the inmates demanding release, who had been confined there several days, without any renewal of the air, except what was obtained by the hurried and partial opening of the doors when the meals of bread and water were thrust in. The air of one of these cells was tested with lime water by the writer, and was proved to consist of an immense proportion of carbonic acid gas.

A brief illustration will now be given of the evils resulting from this exclusion of pure air and frequent inhalation of the same.

In the first place, oxygen being essential to the vigor and tone of the animal functions, a deficiency of supply must be evinced by an opposite condition of them, viz: weakness and prostration. The muscular, circulatory, digestive, and all other functions of the animal economy, depend, in a great degree, for their integrity and strength, upon a due decarbonization of the blood by oxygen. Hence, if this process is not thoroughly performed, if the arterial blood reaches the heart, the stomach, or the muscles, in a condition unfitted to stimulate them to an active discharge of their functions, those functions cannot be executed with the same energy as when stimulated by blood in a proper state of oxidation.

Oxygen is the natural stimulus, carbon the natural sedative of the animal functions. By withholding the first, and thereby creating an accumulation of the other (and the latter effect is an inevitable

result of the former), the evil consequences of that condition will very soon be made apparent. They will be observed in a degree proportioned to the amount and length of continuance of the causes mentioned. They will vary in accordance with the diatheses of the individuals affected. In one, dyspepsia will be first apparent, in another headache, in another rheumatism, in all debility, loss of energy, despondency; and in many instances the seeds of serious and fatal diseases will be sown, or if already sown, will be nurtured and developed into maturity.

Under these circumstances, the system becomes much more impressible by morbid influences. It is in a measure deprived of that energy which enables it to overcome the morbific agencies which ever surround it, and falls an easy prey to their never-ceasing attacks.

This increased sensibility to morbid impressions is evinced by the large proportion of individuals who are affected by sudden changes of temperature, diet or clothing. Their mental as well as corporeal natures partake of this irritability; oxygen, the main supporter of bodily and mental vigor, being withheld, the entire organism is influenced more or less by the preponderence of those disturbing agencies within the system which it is the province of the oxygen of the air to remove or neutralize.

Says Mr. Wyman, in speaking of the want of ventilation in the Massachusetts state prison, during the summer months, especially in July and August, "after one or two hot nights, the number of patients in the hospital is much increased. Their symptoms are a dull headache, dizziness, sometimes so great as to make them reel in attempting to walk, a sense of heaviness in the head, suffused eyes, and a quick pulse; to these are also added, prostration of strength and diarrhœa. These symptoms are soon removed by sleeping in the hospital, rest and simple medical treatment."*

An instance of the exceeding sensibility to the influence of morbific agencies, produced by prison life, occurred on one occasion in the State prison at Sing Sing. Nearly 150 male convicts, almost a quarter of the whole number, were on one night attacked in their cells with cholera morbus. One of two dietetic changes was assigned as the probable cause; but I deem it quite safe so say, that whichever it might have been, neither would have been sufficient for such an extensive effect under the ordinary circumstances of civil life. It

* Practical Treatise on Ventilation, p. 267.

was chiefly due to the morbid irritability and sensibility attendant upon the unnatural circumstances of prison life, of which I believe unventilated cells and rooms to be the most potent for evil.

The following case is copied from the 22d report of the Prison Association:

"A striking illustration of the effects of non-ventilation occurred in the State prison at Auburn, about four years ago. During one cool night, fires were made in the stoves of the hall after the convicts had entered the cells, when the air became so foul that about two o'clock in the morning over forty of them were found in a state of partial or total insensibility and asphyxia, some vomiting, breathing hard, &c., and they were only rescued by taking them out, dashing cold water over them, rubbing them, and giving them fresh air and appropriate medicines. Twenty or thirty were unable to labor the next day. These effects were manifestly from carbonic acid gas and other animal effluvia. Since that time, before making the fires in the morning, care is taken to purify the air thoroughly by open windows and doors, and other available means, but there is no systematic method of ventilation, although such a method might easily be applied, at a moderate expense, to the ultimate advantage of both health and economy." There is another source of this almost fatal influence, besides carbonic acid, which prevails more or less in almost every prison in this and other states, owing to the neglect of the necessary sanitary measures. Its almost constant prevalence in the cells and halls is discoverable by the olfactories of any visitor. I refer to the suphuretted hydrogen gas and other poisonous emanations from the night vessels, which pervade not only the cells in which they are placed, but also the entire area of the halls. The application of a disinfectant would totally obviate this most serious nuisance, and this can be accomplished by the occupant of each cell, in the most simple, easy and economical manner, by the use of a neat and simple apparatus in the form of a cover, called the *Ready Disinfector*, recently contrived for the purpose. By the commission recently appointed by the N. Y. Prison Association, for the examination of all the prisons in the United States and Canada, we are told: "In all the State prisons, except those of Pennsylvania, night tubs for the cells are in use." The reason of the foul odor of these institutions, containing from 100 to 1200 of these sources of sulphuretted hydrogen and ammonia, is therefore very plain, and the means for its prevention, just alluded to,

equally clear, and at a very trifling expense. Such a method of applying disinfectants should be attached to every night-pail and every water-closet in the country, as thereby all foul gases from that source might be avoided, and the drainage and sewerage everywhere would be also deodorized.

The ventilating and air-supplying apparatus of the Pentonville prison in England, is capable of giving each prisoner 30 cubic feet of air per minute, in his cell, while in but one or two of the prisons of this State, is there to be seen a system of ventilation in any degree adapted to the natural demands of health.

It is a well established principle in medicine that the pulmonary, cutaneous and other secretions of the human body will, when confined near the person, without sufficient dilution by atmospheric air, and kept at a certain degree of heat, become decomposed and produce poisonous miasma, which will react upon the body and generate disease within it. This is known as idio-miasma; the disease which it produces is peculiar, being marked by a certain train of symptoms which distinctly characterize it, and is known as the typhus or typhoid form of disease.

Especially is this poison eliminated when numbers of persons are crowded together without ventilation, and subjected, in addition, to filth and deficient or improper food.

From this source is derived the disease which has recently been so abundant and fatal among the immigrants from transatlantic lands. Crowded in the transport ships, without sufficient air to dilute the effluvia of their own bodies, the surrounding atmosphere becomes putrid and noisome beyond endurance; the loss of energy consequent upon the absence of the natural stimuli of life adds to the difficulty by increasing the filth and heat of the apartment, and the almost inevitable result is more or less of the ship or typhus fever.

The same disease, originating in the same causes—confined air, crowding, filth and heat—has frequently broken out in prisons; but, terribly fatal as it has sometimes been observed to be on shipboard, nothing that we have seen of its ravages there can compare with its devastating mortality in prisons. When occurring in these institutions it is called the *jail fever.*

It may prove instructive here to cite a few instances of the occurrence of this pestilence.

One of the earliest recorded is related by Camden in his "Annals of Elizabeth," as happening in 1577. "In these days," he

says, "while the judges of assizes sate at Oxford, and one Rowland Jenks, a saucy, foul-mouthed bookseller, was indicted for scandalous words against his princess, the greatest part of those who were present, whether through a poisonous and pestilential vapor, the stink of the prisoners, or damp of the ground, were taken in such a way that they died almost every one of them within forty days or thereabouts; and none else were touched with the contagion." * * * * "Almost all the jury died, and others to the number of three hundred, or thereabouts." Page 223.

Sir John Pringle, in his "Observations on Diseases of the Army," says: "Jails have been often the cause of malignant fevers, and perhaps nowhere oftener than in this country" (England). Lord Bacon remarks: "The most pernicious infection next the plague is the smell of the jail, when the prisoners have been long, and close, and nastily kept: whereof we have had in our time experience twice or thrice, when both the judges that sat upon the jail, and numbers of those who attended the business, or were present, sickened upon it and died. Therefore," he adds, "it were good wisdom that in such cases the jails were aired before they were brought forth." By this his lordship appears more solicitous, as was very natural, for the safety of the judges, jury and lawyers than for the prisoners confined in the jail, though the manner in which this was kept was undoubtedly the cause of the whole difficulty. In the philosophy of this suggestion Lord Bacon certainly appears less Baconian than usual.

In Storrs' Chronicles, as quoted by Pringle, is the following account of a similar endemic:

"In the year 1850, on the 11th of May, the sessions began at the Old Bailey, and continued for some days, in which time there were more criminals tried, and a greater multitude was present in the court than usual. The hall in the Old Bailey is a room of only about thirty feet square. Now whether the air was most tainted from the bar by some of the prisoners then ill of jail distemper, or by the general uncleanliness of such persons, is uncertain, but it is probable that both causes concurred. And we may easily conceive how much it might have been vitiated by the foul steams of the bail dock, and of the two rooms opening into the court, in which the prisoners were the whole day crowded together till they were brought out to be tried. It appeared afterward that these places had not been cleaned *for some years*. The poisonous quality of the air was aggravated by the heat and

closeness of the court, and by the perishable matter of a number of people of all sorts, penned up for the most part of the day without breathing the fresh air, or receiving any refreshment. The bench consisted of six persons, of whom four died, together with two or three of the counsel, one of the under sheriffs, several of the Middlesex jury, and others present to the amount of about forty, without including those of a lower rank, whose death may not have been heard of, and without including any that did not sicken within a fortnight after the session."

Following this paragraph is a description of some peculiar features of this disease, which need not here be quoted. He then states: "By Dr. Huxham's observations we find that the same kind of fever has been frequent at Plymouth during the former war, occasioned by the number of French prisoners, and by the hospitals and other places being crowded with men taken out of our own ships actually ill of the distemper."

But the culmination of the intensity and mortality of this disorder was reached in 1756, in the Black Hole of Calcutta. One hundred and forty-six persons were there confined in a room eighteen feet square, from seven or eight o'clock in the evening, till six the next morning, when twenty-three only were found alive. Most of the survivors had a high putrid fever, of which some of them died soon after. As there were but two small windows in the apartment, it might reasonably be supposed that the deaths were caused by suffocation merely. But the attending circumstances prove that this was only the remote and not the immediate cause of the mortality. Had it resulted from mere want of air, the demand of the unfortunate men would have been for "air;" but the cry was for "water, water," a terrible thirst, with a raging fever, accompanied with drenching perspiration, and in many cases violent delirium, which are not the symptoms of suffocation merely. Among the survivors was a Mr. Holwell, an officer, who partially quenched his thirst by sucking the perspiration from his shirt, upon which it accumulated, and who, we are told, was, with the other survivors, seized with *typhus fever* after their liberation; a fact confirmatory of the character of the miasm which operated with such extraordinary virulence and rapidity.

To what extent the managers of British prisons have profited by the experience of these cases, may be judged from a recent report of the inspectors on the sanitary condition of the Provincial penitentiary, in Kingston, Canada. They inform us that an

epidemic of typhoid fever prevailed uninterruptedly in the prison during 1862 and 1863, and continued unhappily throughout the whole of 1864, and on the last day of the year there were still seventeen cases of fever under treatment. The total number of cases, and also the number of deaths, was indeed greater in 1864 than in 1863, though the number received in the prison was 100 less. In 1863, there were 258 cases, and in 1864, 381. The last year, 1864, was also marked by the continued prevalence of diarrhœa, no less than 206 cases having been admitted into the hospital, and a much larger number were prescribed for, who were not admitted.

The inspectors frankly admit this almost unprecedented condition to be due to two principal causes, viz: defective ventilation and imperfect sewerage, whereby the night soil was enabled to exert its poisonous influence effectively. The difficulty of providing good sewerage is due to the bad location of the prison, it being on a low level of ground. They propose to deodorize the night soil, and cart it away for agricultural purposes, but it is plain that without some such mode of applying disinfectants as the ready disinfector before alluded to, but little advantage will be gained thereby.

Turning our attention to our own day and country, we find several instances of jail fever recorded. For instance, Prof. Jno. W. Francis, M. D., relates the following; In the month of Sept., 1811, a febrile disorder, of the typhoid character, made its appearance in the debtors' prison in this city (New York); its origin was owing to causes similar to those which usually produce a vitiated state of the atmosphere in confined apartments, the want of pure air and the crowding of large numbers of persons together. The contagion thus engendered was observed to operate with peculiar severity upon those individuals who were suddenly introduced into this vitiated air."

Another instance, recorded by the same distinguished physician, occurred within three years after that. He says: "About the 16th of July, 1814, several cases of the *typhus carcerum* (jail fever), occurred in the Bridewell of New York. The disease was first observed to exist in an apartment of the institution commonly called the eastern wing, a room about 50 feet long and 25 feet broad. Within a very few days after, the complaint became more general; and out of 85 individuals at that time confined in this part of the building, nearly 40 were taken ill with symptoms char-

acteristic of typhoid fever. The disease in this instance, as in the former, was produced from the local circumstances of the place:—the crowded condition of the ward, the want of cleanliness about the person, and in the clothing of the prisoners, and the neglect of free ventilation. The increased impurities of the atmosphere of the apartment seemed to give additional activity to the virulence of the disease; of the persons thus affected, a large majority were those who had come from a pure air, and were but recently subjected to the noxious air of the place, several not more than 30 or 40 hours, and many not more than 3 or 4 days." In proof of the local origin of the disease, Dr. Francis alludes to the "healthy condition of the prisoners in other apartments of the Bridewell."

In concluding his report on these cases, Dr. Francis makes a remark, which, as it appears to have received general concurrence, demands a notice in this place, especially as I regard it erroneous in consideration of the hygienic laws necessary for the maintenance of general health, and the prevention of this disease in particular. He says: "It is a remark of most writers, that the infection of typhus, whether occurring in jails, ships, or elsewhere, becomes concentrated, and consequently more active by *the cold of winter*. This opinion is strengthened by the well known fact that a greater number of deaths take place from fevers of this nature, in our prisons, during the winter than in the summer season."

Against this opinion of my late learned and highly esteemed friend, I respectfully enter my dissent, and for the following reasons:

1. A certain degree of heat is necessary for the decomposition of the animal effluvia, which gives rise to the fever. Absence of ventilation causes an accumulation of these effluviæ; and though I wish not to be understood as saying that cold will destroy the noxious character of the miasm, as is the case in yellow fever, yet some elevation of temperature is necessary to give it efficiency as a poisonous agent, and a low temperature has much influence in preventing the decomposition which brings the poison into existence.

2. We have a more rational cause for the increased severity and fatality of the disease in winter, in the fact that the doors and the windows are all closed, whereby the dilution of the poisoned atmosphere by fresh air from without is almost wholly prevented. In summer, these are generally all open, and thereby the concentration of the miasm is much prevented, while in win-

ter, in consequence of the confined atmosphere, this must rise to its highest point of intensity.

Mere cold, therefore, so far from aiding to increase the disorder, would in the open air have the opposite tendency, and it can only by preventing the dilution of the foul air, indirectly increase the activity of the contagion. The great necessity of thorough artificial ventilation *at all seasons* is thus increasingly demonstrated.

There cannot be much doubt that a great proportion of the fevers reported as occurring in prisons of the present day are due to the vitiated atmosphere of the cells and workshops. The reports from Ohio, already quoted, give 1,042 cases of different types within about three years, with an average of 500 prisoners.

During a visit made in the month of October last by the writer hereof, to half a dozen county prisons in this State, the foul odor herein alluded to was plainly discernible in all, and in two or three of them it was so excessively pungent as to render the air too foul to be endured. Nearly all the jails are connected with the court houses, also with the keepers' residences, hence it would create no surprise to hear, at any time, of a repetition of the dreadfully serious effects which occurred in 1577 at the assizes at Oxford, and at the Old Bailey in 1750, whereby not only the prisoners, but also the judges, the jurors, the attorneys and spectators were attacked with the zymotic poison, and killed thereby to the extent of several hundred. The late occurrences at Auburn, and in Kingston, Canada, before described, demonstrate how little benefit has been derived from those earlier disasters, all which troubles and mortality might have been avoided by the use of the simple instrument known as the *ready disinfector*. Its application to every night-pail in prison cells should be a matter of sanitary statute. Every occupant of a cell would doubtless be pleased to have such a means of preserving his lungs and senses from the foul gases to which they are now subject, and would give it special attention, and by its use all danger of sickness from that powerful source would be prevented, both in the buildings and from the cesspools and sewers into which the pails are emptied.

Another very important point of the sanitary management of prisons is that of the *occupation of the inmates*. In nearly every one of the county jails they pass days, weeks and often months without any exercise whatever, being confined to the cells and corridors in total idleness, without even opportunity of exercise

by walking outside the building. The consequence thereof is necessarily debility of the muscular and nervous system, with impairment of the digestive powers, rendering them more than ordinarily subject to the various disorders before alluded to. No human being can sustain his physical health and strength without a certain amount of muscular exercise and the respiration of pure air; hence it is the manifest duty of all who have the custody of criminals, which also involves the responsibility of their health to furnish them with opportunities for the practice of those natural laws.

On the other hand, it is sometimes observed that in State prisons and penitentiaries the indoor labor of the convicts is required of them to an excessive extent, and without the needful amount of food and air to meet the physiological requirements of health and strength. The exhaustion thus produced is a manifest effect in many instances in prisons, but is very rarely observable among shop laborers out of prisons, because of their daily opportunities of partaking of the pleasures of outdoor exercise and breathing, and more especially are farm laborers free from it, on account of their more natural exercise and habits of life.

Punishments.

The subject of prison punishments is an important hygienic, as well as moral and disciplinary question. The mental and physical influences exerted thereby are of importance to both the health and reformation of the convicts, and the adoption of measures for the latter object is far more likely to maintain the former, than those which merely effect his corporeal feelings. The principal mode of corporal punishment heretofore and for a long time in vogue in the prisons of this State, by the *cat*, was finally carried to such excessive severity as to prostrate both the physical and moral powers of its subjects; the mental excitement produced by it became so great, and it so degraded and moral faculties, as greately to diminish the reformatory disposition, and the Legislature very appropriately interposed, and by law prohibited it *in toto*.

The keepers who, during that practice, were, with occasional exceptions, too much devoid of those moral and humane sentiments which should preside over such duties, being thus foiled in the means of venting their passions and revengeful desires, resorted to the equally objectionable mode of punishment by the

shower. For this purpose the prisoner, entirely nude, is seated in a narrow box, with his head and arms immovably fixed, his head thrown slightly back, his neck encircled with a wide, trough-like collar, the edge of which turns up to a level with his mouth; and thus helplessly bound, there is poured upon him, in several large and rapid streams, from ten to one hundred gallons of cold water. The physiological effects of this may be understood by the following extract from a standard work on hygiene, by Dr. J. H. Pickford, of London:

"The pulse may be reduced to fifty beats in the minute, and may be irregular and quite imperceptible by long-continued action of *cold water* on the surface of the body. A shower or douche bath, delivering per minute from thirty to forty gallons of water, at 64° or 65°, will occasion the immediate depression and reduction of the pulse to this extent. A shower bath of eight gallons only, at 47°, reduces the *volume*, but does not affect the *frequency* of the pulse. At 74°, or 110°, no perceptible effect is observed."

Now if thirty or forty gallons (about one barrel) of water at a temperature of 64°, will reduce the pulse to fifty beats in a minute, it may readily be conceived that three barrels of water, at a much lower temperature, will completely paralyze the heart and destroy the life of the subject, *as it actually did a few years ago in the Auburn State prison, the individual being an able bodied man.*

The practice of confining convicts in dark, air-tight cells, for several days, or even hours, as is done in many prisons, is of all modes of punishment the most objectionable in a sanitary point of view, as each one is certain, after one hour's confinement, to inhale no other gases than the emanations from his own lungs, skin, and intestinal and urinary excrements, whereby all his vital energies become depressed, and the object of the punishment is wholly lost, in consequence of the depression of his mental functions rendering him incapable of appreciating the object had in view. In fact such a system of punishment endangers not only the life but likewise the mental sanity of every one so treated.

The true and most effective mode of maintaining discipline, and promoting the reformation of prisoners, and also of strengthening their intellectual, moral, and physical powers, is to *encourage good behavior by offering rewards therefor*. The convict being deprived of all the advantages of every relation of life, personal, social, political, &c., an encouragement to hope for their restoration by an offer of the enjoyment of advantages while in confinement, and

more especially by a prospective abbreviation of his term of sentence, would doubtless be found the most rational, easy and effective method of maintaining discipline, and encouraging future good conduct. Let every prisoner see that moral conduct and obedience to law, is sure to meet with immediate reward, and the practice of it is certain in a great majority of cases; and such a lesson in prison is far more likely to be followed after discharge. Such a principle of education as as likely to be beneficial in a hygienic as in a moral point of view.

The topics which have been thus partially discussed, may afford some idea of the importance which should be attached to the office of Prison Medical Adviser, and in conclusion, a few remarks will be presented in reference to the duty of governments to bring to their aid in their prison departments, the services of the best medical talent. In the commencement of this essay allusion was made to prison medicine being a peculiar and distinct branch of the science. The board principles of physiology, chemistry and anatomy of course cover this as well as every other department of it, but in its etiology, pathology and prophylaxis, there is much to be studied, which the ordinary practitioner sees nothing of.

Public hygiene, or state medicine, as it is termed in Europe, where it receives much attention, has become recognized as a distinct department of the profession. It embraces the study of *public* health. It considers the causes of diseases as they are presented on a large scale, having reference to the location of towns and dwellings, the character of soils, interior of residences, atmosphere, climate, sewerage, ventilation, nuisances, &c., and also statistical data of marriages, births and deaths. As a section of this department of the science, and yet as connected with the practice of the art, prison medicine should be specially regarded, in which case it would savor of wisdom to place the medical superintendence of all prisons upon such a footing as respects rank, stability and remuneration, as to enable it to procure the best of that species of talent which it peculiarly demands.

Human beings are to be observed and treated in those institutions in masses, as well as individually. Hundreds being subjected to the same rules of diet, clothing, residence, labor and emotions, their diseases and treatment are to be regarded in the same collective manner, while they also come under the eye of the physician individually.

We have a great deal in prison medicine yet to learn, and the

remuneration of the medical officers should be sufficient to induce the most experienced and most capable men to occupy those positions.

Among the questions which the physician of a prison is frequently called upon to decide is that of the insanity of the convicts, one of the most delicate and difficult of all. The most careful and acute observations, the most adroit and scrutinizing investigations, will sometimes fail to render a satisfactory solution of the case. It may be feigned, it may be real, the subject may be a responsible or an irresponsible being, and if this nice line of distinction between sanity and insanity may baffle the ability of a master, surely its decision should not be left to a tyro. While the physician should be able to point out clearly the really disordered minds, he should also be able with bold cunning to meet the machinations of those whose whole lives have been spent in deception, and are ever ready to escape from labor. Neither is it always easy to detect the feigning of corporeal diseases—a point of practice which the ordinary practitioner of medicine is never required to perform, but which in prison is a matter of almost daily occurrence.

Sound judgment, correct knowledge, and no little industry are necessary to enable the medical officers of our large prisons to keep the records of their doings intelligently and well.